CHAPTER 8

POLLUTION PREVENTION PROGRAMS TO REDUCE CONTAMINANTS IN CSOs

The seventh minimum control, pollution prevention, is intended to keep contaminants from entering the CSS and thus receiving waters via CSOs. Congress enacted the Pollution Prevention Act of 1990 to establish a national strategy for pollution prevention. Section 6602(b) of the Act establishes the following hierarchy for pollution management efforts:

- Pollution should be prevented or reduced at the source whenever feasible.
- Pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible.
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible.
- Disposal or release of pollution into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

The objective of this minimum control is to reduce to the greatest extent possible the amount of contaminants that enter the CSS. Most of the suggested measures involve behavioral change rather than construction of storage or treatment devices.

8.1 Control Measures

Pollution prevention measures such as street cleaning, public education programs, solid waste collection, and recycling can keep contaminants from entering the CSS.

8.1.1 Street Cleaning

Street litter can be removed by mechanical or manual street cleaning or by street flushing during dry weather periods. Daily street cleaning in critical areas might be necessary to significantly reduce CSO floatables. Street cleaning will not control litter from off-street areas. Parked cars prevent the removal of litter and other materials from curbsides. Enforced parking

regulations (e.g., alternate side of street parking at different days of the week) and public awareness about the necessity of street cleaning are necessary for effective litter removal.

8.1.2 Public Education Programs

Anti-litter campaigns can reduce the amount of street litter and household items that enter CSOs and storm water outfalls. Public education programs can encourage the proper disposal of sanitary and personal hygiene items, which cause the greatest public concerns and can close beaches. Education programs can also advise the public about proper application of fertilizers, pesticides, and herbicides.

Education methods can include public service announcements, advertising, stenciling of street drain inlets, and distribution of information with water or sewer bills. In addition, these programs can also include elements that focus on commercial and industrial establishments.

8.1.3 Solid Waste Collection and Recycling

Trash receptacles along city streets should reduce the amount of litter on streets, if the receptacles are properly placed, maintained, and cleaned. Street litter in some key densely populated areas can be reduced by collecting domestic curbside garbage more frequently. Recycling programs can reduce the amount of street litter.

8.1.4 Product Ban/Substitution

Many materials that foul beaches, including polystyrene, do not degrade in the environment. Some oceanfront communities have banned the sale of certain food products packaged with these materials. In various areas nationwide, cities and environmental groups have worked with businesses to eliminate the production and sale of fast food items packaged with these materials.

8.1.5 Control of Product Use

Public facilities or public agencies can control the use of problem materials (e.g., fertilizer and pesticides in parks, application of de-icing salt in areas where discharges occur to fresh water bodies).

8.1.6 Illegal Dumping

Public education, notices in appropriate places, and enforcement programs can be used to control illegal dumping of tires, used motor oil, and other materials into waterways, storm drain inlets, catch basins, or onto the ground.

8.1.7 Bulk Refuse Disposal

Designated municipal disposal facilities accept materials such as home renovation debris that are not accepted by normal curbside garbage collection. Commercial establishments can be encouraged to accept used or waste materials including used crankcase oil, worn tires, and dead batteries.

8.1.8 Hazardous Waste Collection

Designated areas should be established, either on a permanent or periodic (annual or semi-annual) basis, where any type of household hazardous waste can be brought for collection and environmentally safe disposal. Permanent disposal sites can be established for collection of hazardous wastes.

8.1.9 Water Conservation

Water conservation will reduce dry weather sanitary flow and increase the volume of combined sewage that can be retained in the CSS and treated at the POTW treatment plant. Water conservation at larger industrial facilities might reduce dry weather flow significantly. Unless dry weather flows represent a large portion of the combined sewer flow causing overflows, however, the effect of this activity might be limited.

8.1.10 Commercial/Industrial Pollution Prevention

Municipalities should actively promote pollution prevention for commercial and industrial establishments located in their combined sewer areas. Such establishments, particularly those with waste oil or hazardous waste storage, can be required through the local sewer use ordinance or sewer use rules and regulations to develop and implement an appropriate pollution prevention plan and apply best management practices (BMPs) to minimize pollutant discharges into storm drains in the combined sewer areas.

The EPA guidance, *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices* (EPA, 1992) can be used as a reference. Another EPA document, *Municipal Wastewater Management Fact Sheets - Storm Water Best Management Practices* (EPA, 1993), provides useful guidance on pollution prevention practices.

8.2 Performance and Cost

The degree to which pollution prevention can reduce contamination of receiving water bodies through CSOs is not known. In theory, the costs for each unit of pollution reduced through prevention should be less than it would be to collect and physically treat that same unit at the CSO. In some circumstances, however, source control measures sufficient to provide effective pollution control over a diffuse area could be more costly than control measures at CSO outfalls. For example, the effectiveness and overall costs for street cleaning depends on the frequency of cleaning, the number of cars on the street, the degree of enforcement of alternate-side-of-the-street parking regulations, and the volume of litter. In some cases, it would be more cost-effective to screen CSOs at a centralized location than to clean the streets often enough to effectively control pollutants.

8.3 Considerations

Frequently, the actions that prevent or reduce the introduction of specific pollutants into a CSS will be cost-effective in reducing the amount of pollution discharged in CSOs.

Even in cases where pollution prevention measures provide limited tangible benefits, they can have two important ancillary benefits. Reductions in the quantity of pollutants entering the conveyance system will reduce the O&M effort on any overflow control that may be implemented as part of a CSO control program. In addition, public participation in pollution prevention programs will serve to heighten awareness of CSO issues and might increase public support for the overall program.

The measures discussed above generally involve the cooperation of the general public. Many measures involve changes in such habits as to how materials are generated and disposed. The municipality can educate and encourage the public but will have limited control over the degree of implementation and, hence, limited control over the actual pollutant reductions.

8.4 Example of Implementation

Eugene, Oregon, has a comprehensive public outreach effort to raise community awareness of storm water management issues. This effort involves telephone surveys to determine community awareness, quarterly newsletters mailed to all city residents (more than 69,000 copies of each issue), educational events, civic and club presentations, and handouts. Although Eugene's effort focuses on storm water, similar efforts can be implemented to inform the public about CSO problems to improve the effectiveness of pollution prevention programs.

8.5 Documentation

The following list presents examples of documentation that could be submitted to demonstrate diligent effort in evaluating this minimum control and a clear understanding of the measures being implemented:

- A summary of the alternatives considered
- A list and description of the measures planned for implementation and the name of the individual or department responsible
- A cost estimate and the implementation schedule

- An estimate of the benefits expected from the minimum control actions
- Samples of the public educational materials planned for use
- A list of pollution prevention plans that have been developed, if appropriate.

CHAPTER 9

PUBLIC NOTIFICATION

The intent of the eighth minimum control, public notification, is to inform the public of the location of CSO outfalls, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities (e.g., swimming and shellfish harvesting) curtailed as a result of CSOs. Public notification is of particular concern at beach and recreation areas directly or indirectly affected by CSOs. Potential risk is generally indicated by the exceedance of relevant water quality criteria.

The most appropriate mechanism for public notification will probably vary with local circumstances, such as the character and size of the use area and means of public access. The measure selected should be the most cost-effective measure that provides reasonable assurance that the affected public is informed in a timely manner.

9.1 Examples of Control Measures

The following list highlights potential measures for notifying the public about CSO events:

- **Posting at Affected Use Areas**—Posting at the affected use areas (e.g., along a beach front) might be most appropriate when use restrictions are temporary.
- **Posting at Selected Public Places**—Posting at selected public places (e.g., a public information center at a park or beach) might be appropriate in the case of longer-term restrictions or where a relatively narrow segment of the public is likely to be affected and can be reached via the public places selected for display.
- **Posting at CSO Outfalls**—Posting at CSO outfalls is advisable where outfalls are visible and the affected shoreline areas are accessible to the public.
- **Notices in Newspapers or on Radio and TV News Programs**—Newspaper or radio/TV notices might be appropriate for situations that are not routine or are unusually severe in terms of impact or public sensitivity, such as beach closings.

- **Letter Notification to Affected Residents**—Letters to affected residents would be appropriate primarily for situations that reflect longer-term restrictions and that do not require prompt notification. This approach is most likely to reach all potentially affected parties and provides an opportunity to give more detailed information.

- **Telephone Hot Line for Interested Citizen Calls**—A telephone hotline might be appropriate in cases where restrictions on a use (e.g., beach closures) occur relatively frequently, affect a large number of people, and might change daily.

9.2 Performance and Cost

As a minimum control, public notification actions have no direct effect on reducing overflows and pollutant loads from CSO systems, or on minimizing water quality impacts. Notification, however, will diminish the potential risk of adverse public health effects. Such actions will also increase public awareness and might increase public support for CSO control programs.

The cost of an adequate public notification procedure will vary with the method(s) employed and with the size of the potentially affected population. In general, costs should be nominal. For example, many areas already have programs for beach postings. The media might provide newspaper or TV announcements as a public service. Letter notifications are usually appropriate only in a few situations. Although a telephone hot line might be more costly, this might be an effective public service in certain situations.

9.3 Considerations

The principal advantage of a notification program is the reduced exposure of the general public to potential public health risks.

Limitations associated with this minimum control are related to the degree of assurance that the notification method(s) selected will provide the necessary information to the appropriate audience. Many municipal agencies probably have the staff and mechanisms for implementing this control; others will have to develop the necessary organizational arrangements and allocate other resources to comply effectively.

Posting at CSO outfalls might be more difficult in cases where outfalls are on private property.

9.4 Documentation

Following are examples of documentation that could be used to demonstrate diligent effort in evaluating this minimum control and a clear understanding of the measures considered:

- A list and description of the measures planned for implementation and the name of the individual or department responsible
- The procedures or protocol for issuing notices
- Samples of the public educational materials (e.g., circulars or notices) used or planned for use and a photograph of a typical sign, if applicable
- A list of the locations where signs are posted (or will be posted)
- A log of CSO occurrences and associated public notification.

CHAPTER 10
MONITORING TO CHARACTERIZE CSO IMPACTS AND THE EFFICACY OF CSO CONTROLS

The ninth minimum control involves visual inspections and other simple methods to determine the occurrence and apparent impacts of CSOs. This minimum control is an initial characterization of the CSS to collect and document information on overflow occurrences and known water quality problems and incidents, such as beach or shellfish bed closures, that reflect use impairments caused by CSOs. Changes in the occurrences of such incidents can provide a preliminary indication of the effectiveness of the NMC.

This minimum control is the precursor to the more extensive characterization and monitoring efforts to be conducted as part of the LTCP to assess changes in pollutant loadings or receiving water conditions. EPA's manual *Combined Sewer Overflows - Guidance for Monitoring and Modeling* (EPA, 1995d) addresses monitoring and modeling program requirements associated with the LTCP. The manual provides detailed guidance on how to plan, design, and implement a monitoring program that will enable determination of pollutant loadings, receiving water quality impacts, and design of structural CSO controls to implement the LTCP.

10.1 Examples of Characterization Measures

This section describes how to characterize the CSS, determine the frequency of overflows, and identify CSO impacts.

10.1.1 General Characteristics of the Combined Sewer System

The municipality should first obtain maps, tables, and other general information on the characteristics of the system, including the layout of the CSS, the population served (including percent associated with the combined portion of the system), locations of CSO outfalls, and locations and designated uses (e.g., swimming, shellfishing) of receiving waters. This will

provide a spatial reference for records of overflows and use-related incidents developed under this minimum control.

10.1.2 Overflow Occurrences

The municipality should record the number of CSO overflows at as many outfalls as feasible. Small municipalities with few outfalls should be able to document overflows at each outfall. Large systems should work with the NDPES permitting authority to select a percentage of outfalls that represents the entire drainage area and sensitive locations. EPA's monitoring and modeling guidance (EPA, 1995d) provides more detailed information on selecting an appropriate number of outfalls for monitoring.

The municipality should record the date and time of each overflow event through visual observation or by an appropriately placed flow or level sensor. In addition, the municipality should measure and record the total daily rainfall, using a suitably placed rain gage.

At a minimum, monitoring under this minimum control should develop information on the frequency of overflows at individual points in the system. EPA also recommends the development of information on the duration and magnitude of overflow events, where feasible. Such information can enhance the implementation of CSO controls and can enable measurement of the effectiveness of particular control measures.

Monitoring of flow and quality at the level necessary to calibrate models and/or estimate pollutant loadings is addressed in EPA's monitoring and modeling guidance (EPA, 1995d), as well as the monitoring/modeling section of the *Combined Sewer Overflows - Guidance for Long-Term Control Plan* (EPA, 1995c), and may be beyond the intended scope of minimum control monitoring.

In cases where a calibrated model of the CSS exists (or when one becomes available), model projections may be used to determine the frequency and location of overflow events.

The following measures can be applied to detect overflows:

- **Visual Inspection**—This requires the physical presence of an observer at each CSO point during each storm event. An extended presence during long rainfall events would be necessary, unless a history of the types of storm events producing overflows provides a reliable basis for selective visual inspection. This technique may be appropriate for very small CSSs with only a few outfalls. In general, however, some type of visual inspection aid will be necessary.

- **Visual Inspection with Inspection Aids**—Techniques such as chalking and block testing can lower the personnel requirements for detecting overflows. Observations at each overflow location are necessary before and after a forecasted event.

  - A chalk mark can be drawn on a wall of a regulator chamber, leading, for example, from the top of an overflow weir to the top of the chamber. The mark will wash off when the water level rises high enough to overflow the weir. This provides a crude indication of maximum water level.

  - Wood blocks are placed in positions where an overflow will displace them. The blocks can be anchored with retrieval lines for repeated use. This technique is particularly suitable for use with weirs.

  - Simple mechanical or electrical counting devices, designed to be activated by water level or movement of a valve or gate, are installed at appropriate locations. The device is triggered each time some physical condition associated with an overflow takes place. Inspection before and after every event is not necessary to develop an accurate count of the number of overflow events.

- **Automatic Measurement**—Automatic monitoring equipment records the output on strip charts and provides the output in digital form. This reduces personnel requirements but can add significantly to monitoring costs. The equipment is relatively sophisticated and requires a knowledge of the system's hydraulic characteristics. In cases where automatic flow or level sensing devices are used with automatic samplers, monitoring efforts may be coordinated with a sampling program. Automatic devices can be either connected to an electrical power supply or battery operated, and backup power supplies should be provided. Automatic devices can be installed at remote or difficult-to-reach locations to reduce personnel requirements.

  - Velocity meters can be placed in outfall lines and will record results on strip charts or data cards. They are useful in less-than-ideal conditions, including outfall lines with leaking tide gates or uncontrolled discharges. They can be calibrated to distinguish tidal velocities from velocities during overflow events. The flow direction can also be determined with appropriate units. Multiple

meters, set at different depths and installed along with a level recorder, have been used to monitor discharge quantities in very large outfall lines.

- Level recorders may be placed in manholes or pipes or behind weirs to provide information on overflow depth. When properly calibrated for the site and with the level recorded in real time on strip charts, the magnitude and duration of an overflow can be determined. Some devices store the data in memory for later downloading to a personal computer for analysis of data and preparation of reports.

10.1.3 Incidents Relating to CSO Impacts

The municipality should develop a routine report to record and summarize information available from other sources (e.g., the Coast Guard, local volunteer groups) on the water quality or use of waters affected by the CSOs. The report may include information on the following activities:

- Beach closings or postings
- Shoreline washup of floatables
- Fish kills
- Hazards to small boat navigation
- Street/basement flooding.

10.2 Performance and Cost

The inspection and reporting activities involved in implementation of this control will generally be applicable to other minimum controls. Therefore, limited incremental costs or additional personnel requirements are expected.

This minimum control should provide useful information on the general performance of the CSS and the effect of control measures. It also will assist in characterizing the nature and relative severity of receiving water impacts.

As part of the LTCP, the municipality will probably need to develop a comprehensive monitoring program. The monitoring approaches described here should be incorporated into this

comprehensive monitoring program. The cost of such a program will vary widely with location, depending on the size and characteristics of both the combined sewer system and the affected water bodies.

10.3 Considerations

The information collected under this control should provide a perspective on existing conditions and a basis for identifying progress that has been achieved by the application of other minimum control measures. Reports of receiving water impacts will assist in providing some indication of the actual, potential, or suspected adverse impacts due to CSOs. Furthermore, if a comprehensive inspection or monitoring program is already part of an LTCP, it might be considered adequate to meet the objectives of this minimum control.

Potential limitations include the cost of monitoring programs and the possibility that overly ambitious monitoring requirements might compete for resources otherwise available for implementation of CSO controls. An appropriate balance should be the objective in all cases. It is essential, however, that a monitoring program measure existing conditions and assess the performance of the minimum control measures.

10.4 Documentation

The municipality should consider the following items for inclusion in documentation for the NPDES permitting authority to demonstrate diligent effort in implementation of this minimum control:

- Identification of CSO locations in the CSS
- A summary of observed incidents (i.e., the number and location of overflow events, as well as duration, volume, and pollutant loadings, if available)
- A summary of existing water quality data for receiving water bodies
- A summary of receiving water impacts that are directly related to CSOs (e.g., beach closing, floatables wash-up episodes, fish kills)

- An assessment of the effectiveness of any CSO control measures already implemented (e.g., reduction of floatables, fish kill incidents)

- Development of a long-term monitoring plan for the LTCP, as appropriate.

ADDITIONAL REFERENCES

New York City Department of Environmental Protection. 1991. *Regulator Improvement Program: Annual Analysis of Bypassing.*

U.S. Environmental Protection Agency. 1992. *Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-005.

U.S. Environmental Protection Agency. 1992. *Storm Water Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices.* EPA 832-R-92-006.

U.S. Environmental Protection Agency. 1993. *Investigation of Inappropriate Pollutant Entries Into Storm Drainage Systems: A User's Guide.* EPA 600/R-92/238.

U.S. Environmental Protection Agency. 1993. *Municipal Wastewater Management Fact Sheets - Storm Water Best Management Practices.* EPA 832-F-93-013.

U.S. Environmental Protection Agency. 1993. *Manual - Combined Sewer Overflow Control.* EPA 625/R-93/007.

U.S. Environmental Protection Agency. 1995a. *Combined Sewer Overflows - Guidance for Financial Capability Assessment* (EPA 832-B-95-006)

U.S. Environmental Protection Agency. 1995b. *Combined Sewer Overflows - Guidance for Funding Options* (EPA 832-B-95-007)

U.S. Environmental Protection Agency. 1995c. *Combined Sewer Overflows - Guidance for Long-Term Control Plan* (EPA 832-B-95-002)

U.S. Environmental Protection Agency. 1995d. *Combined Sewer Overflows - Guidance for Monitoring and Modeling* (EPA 832-B-95-005)

U.S. Environmental Protection Agency. 1995e. *Combined Sewer Overflows - Guidance for Nine Minimum Controls* (EPA 832-B-95-003)

U.S. Environmental Protection Agency. 1995f. *Combined Sewer Overflows - Guidance for Permit Writers* (EPA 832-B-95-008)

U.S. Environmental Protection Agency. 1995g. *Combined Sewer Overflows - Guidance for Screening and Ranking Combined Sewer System Discharges* (EPA 832-B-95-004)

U.S. Environmental Protection Agency. 1995h. *Combined Sewer Overflows - Questions and Answers on Water Quality Standards and the CSO Program* (EPA 832-B-95-009)